

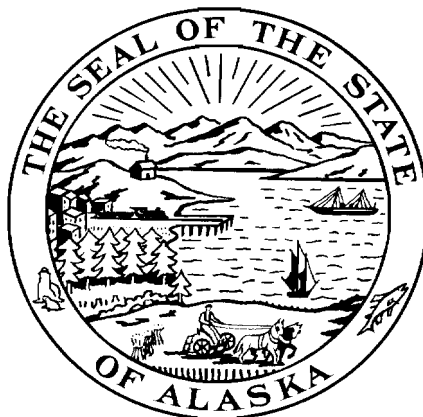
Volume 7

1965-1966

70
SH
11
.A73
14
V. 7

STATE OF ALASKA

William A. Egan, Governor



ANNUAL REPORT OF PROGRESS, 1965 - 1966

FEDERAL AID IN FISH RESTORATION PROJECT F-5-R-7

SPORT FISH INVESTIGATIONS OF ALASKA

ALASKA DEPARTMENT OF FISH AND GAME
Walter Kirkness, Commissioner

E. S. Marvich, Deputy Commissioner

Alex H. McRea, Director
Sport Fish Division

Louis S. Bandirola, Coordinator

3 3755 000 85583 3

ARLIS

Alaska Resources
Library & Information Services
Anchorage, Alaska

Merged with
A.R.I.I.S.
UNIVERSITY AND ALASKA
ARCTIC ENVIRONMENTAL INFORMATION
AND DATA CENTER
707 A STREET
ANCHORAGE, ALASKA 99501

INTRODUCTION

This report of progress consists of Job Segment Reports conducted under the State of Alaska Federal Aid in Fish Restoration Project F-5-R-7, "Sport Fish Investigations of Alaska."

The project during this report period is composed of 18 separate studies. Some are specific to certain areas, species or fisheries, while others deal with a common need for information. Each job has been developed to meet the needs of various aspects of the State's recreational fishery resource. Seven jobs are designed to pursue the cataloging and inventory of the numerous State waters. These jobs, which are of a continuing nature, will eventually index the potential recreational fisheries. Four jobs are directed toward specific sport fish studies. These include specialized efforts toward the anadromous Dolly Varden of Southeastern Alaska, the silver salmon in Resurrection Bay, the king salmon stocks on the Lower Kenai Peninsula, the king salmon stocks in Upper Cook Inlet, and the Arctic grayling of the Tanana River system.

The statewide access program is developing rapidly. Our efforts in investigating existing and potential recreational sites and access has resulted in favorable action being taken on our proposals and recommendations submitted to the land management agencies at both the State and Federal levels.

The remaining jobs included a specialized creel census effort in Southeastern, an egg-take program designed to establish indigenous egg-take sources, and evaluation of the Fire Lake system.

Three special reports have been completed from past studies on the Dolly Varden study. These appear in the Department's "Research Report" series and are a direct result of the Federal Aid In Fish Restoration Program. To date, the following reports have been published: Research Report No. 3, "Some Migratory Habits of the Anadromous Dolly Varden Salvelinus malma (Walbaum) in Southeastern Alaska," 1965, Robert H. Armstrong; Research Report No. 4, "Annotated Bibliography on the Dolly Varden Char," 1965, Robert H. Armstrong; and Research Report No. 5, "Age and Growth of Anadromous Dolly Varden Char Salvelinus malma (Walbaum), in Eva Creek, Baranof Island, Southeastern Alaska," 1966, David W. Heiser.

The material contained in this progress report is often fragmentary in nature. The findings may not be conclusive and the interpretations contained herein are subject to re-evaluation as the work progresses.

RESEARCH PROJECT SEGMENT

STATE: ALASKA Name: Sport Fish Investigations
of Alaska.

Project No.: F-5-R-7 Title: Inventory and Cataloging of
the Sport Fish and Sport Fish
Waters in Southeast Alaska.

Job No.: 1-A

Period Covered: July 1, 1965 to June 30, 1965.

ABSTRACT

Inventory and cataloging of Southeast Alaska waters continued during the 1965-66 fiscal year as a continuation of prior studies.

Investigations were conducted on both upper and lower Southeast Alaska water areas for initial basic inventory, for follow up data on currently managed waters, and for the acquisition of necessary biological information as needs dictated.

A total of 36 lakes and four streams was investigated during this report segment and ten lakes were experimentally stocked with desirable sport fish species.

Experimental spawning and egg take operations were conducted on two species of fish. Steelhead were artificially spawned at Alecks Creek in Tebenkof Bay, Kuiu Island, and anadromous Dolly Varden were artificially spawned at Katlian River, Baranof Island.

An experimental transplant of gravid adult kokanee was conducted on Admiralty Island. The fish were trapped in Distin Lake and subsequently flown to Thayer Lake for introduction.

Watershed uses were monitored, as were access problems and needs, and complete files were maintained in each area field office.

RECOMMENDATIONS

1. The program of exploratory and investigative work be continued both on new waters and those currently included in the management program.
2. Work be planned and conducted along expanding road systems to provide fishery data on newly accessible waters.
3. Lower Spurt Lake, Petersburg area, be chemically treated and restored with desirable sport fish species.
4. The experimental transplant of adult kokanee be continued into Thayer Lake, Admiralty Island.

5. Efforts be continued to determine sites for artificial spawning of anadromous fish species.
6. Continue evaluations of our currently stocked waters and stocking policies.
7. No immediate changes be made in the Southeast Alaska sport fish regulations.

OBJECTIVES

1. To assess the environmental characteristics of the existing and potential fishery waters of the job areas and, where practicable, obtain estimates of angler use and sport fish harvest.
2. To evaluate fishery restoration measures and availability of sport fish egg sources.
3. To assist as required in the investigation of public access status to the area's fishing waters.
4. To evaluate multiple water use development projects (public and private) and their effects on the area's streams and lakes for the proper protection of the sport fish resources.

TECHNIQUES USED

Background data and information from prior studies conducted by the Alaska Department of Fish and Game were used in directing some phases of work activity.

Fish species distribution, population composition, relative abundance, and fish condition were assessed by both 125- x 6-foot (standard variable mesh) gill nets and hook and line.

Water chemistry was accomplished on various waters with a Hach electrical colorimeter, and included dissolved oxygen, pH, alkalinity and turbidities.

Physical survey data collected included stream flows, water temperatures, lake depths and bottom contours, spawning and rearing capacities, and other needed biological data.

Creel census and personal interviews were used in determining angler pressures and success.

Experimental initial stockings and transplants of gravid adult fish or their eggs have been made.

Weirs, seines, or fyke nets have been used to capture fish for artificial spawning or live transplants.

Assistance has been given access personnel in evaluating easement needs to potential recreational areas; and multiple use projects affecting water or watershed use have been reviewed and recommendations made.

Information collected in all waters, multiple use projects, access, etc., is maintained in permanent files in respective field offices and the Juneau headquarters office.

FINDINGS

Upper Southeast Alaska

Thayer Lake Distin Lake, Admiralty Island:

Thayer Lake and Distin Lake were previously investigated, and are reported in Volumes 3 and 5, Report Nos. 3-A and 1-A, Dingell-Johnson Project Reports, 1961-62; 1964-65; State of Alaska. It was recommended by Andrews, (Ibid. 1964-65) that an experimental stocking of kokanee salmon be made in Thayer Lake to evaluate the success of this species as a forage fish for cutthroat trout populations. Distin Lake was selected as a possible source to provide kokanee salmon for transplanting in Thayer Lake.

Kokanee salmon trapping operations were attempted in July, August, and September, 1965, at Distin Lake. Each trapping period was five days in duration. Four lake-type fyke net traps and experimental gill nets were used. Gill nets proved impractical as the mesh size (one-inch stretched) was too large to capture significant numbers. At least 3/4-inch stretched mesh or slightly smaller is recommended for optimum results.

July and August trapping efforts were almost completely negative in results. Sixteen kokanee were taken in July, and ten were taken in August.

September trapping results were productive with 714 adult kokanee salmon captured and successfully transplanted to Thayer Lake. The method of transfer was simple; fish obtained in the tyke traps were held in live boxes and then flown the 4 miles to Thayer Lake in 25-gallon polyethylene containers. No mortality was observed in the transfer procedures.

The negative trapping results obtained in July and August are surmised to be due to the pelagic behavior of kokanee. The shoal areas, where trapping is feasible, are only frequented by large numbers of kokanee during the spawning period. Kokanee salmon in Distin Lake were found to be predominantly beach spawners. No fish were observed utilizing the several inlet streams or the single outlet stream.

Results of the 1965 trapping studies provided preliminary life history and behavior information concerning kokanee salmon in the Distin Lake-Hasselborg Lake drainage for further study. Prior to the present study, seasonal spawning time, summer lake distribution, and size of adult fish were not known. The present studies indicate that kokanee salmon are sexually mature after three summers of lacustrine growth with the period from mid-September through early October the estimated peak of spawning.

Kokanee salmon were found to be lacking in the shallow, shoal areas during July and August and are presumed to be pelagically distributed during this period.

Water temperatures at the surface averaged 64°F during July and August. A thin thermocline was present from 16 feet to 25 feet. September surface water temperatures averaged 56°F. A thin thermocline was still present from 23 to 31 feet.

A sample of 12 fish obtained September 28, 1965 was killed and examined. The length range was from 11.0 cm to 16.5 cm, fork length, with a mean length of 16.0 cm. All fish were sexually ripe and displayed characteristic spawning coloration. Scale samples were obtained and analyzed for age. All scales showed two annuli indicating the fish to be in their third year.

Lake Rehabilitation

Spurt Lake, located on Wind Point in Thomas Bay, approximately 17 miles north of Petersburg, was surveyed in September 1965, to determine its suitability for chemical rehabilitation.

The present fish population is primarily composed of stunted eastern brook trout which contribute little to a desirable sport fishery. One rainbow trout was taken in the sampling nets. The few rainbow trout present in Lower Spurt Lake are a result of downstream movement from DeBoer Lake which lies 500 feet above Lower Spurt Lake. The outlet of DeBoer Lake almost immediately turns into falls of several hundred feet in height, making doubtful any significant rainbow trout recruitment into Lower Spurt Lake.

There is considerable desire among Petersburg anglers for additional rainbow trout fisheries in the area. The close proximity of Spurt Lake (approximately a 10- minute flight from Petersburg) lends itself to high angler use if chemical rehabilitation can be accomplished. Three inlets flow into the lake, giving a total late summer flow of 6 to 8 cfs. There are also several muskeg ponds adjacent to the lake that will need additional investigation. It is doubtful that any of these ponds drain into the lake.

No unusual problems appear to exist regarding treatment of the lake or its tributaries. The physical statistics of Spurt Lake are shown in Table 1.

TABLE 1 - Spurt Lake Volumetric Survey Statistics.

Maximum Depth	= 171 feet
Mean Depth	= 73 feet
Surface Area	= 263.5 acres
Acre Feet	= 19,450.5
Gallons Water	= 6,337,945,425

Fish Stocking

The following lakes were investigated, found barren of fish life, and subsequently stocked. Both lakes were experimentally stocked with grayling, becoming the only two lakes stocked with this species on Baranof Island.

TABLE 2 - Grayling Stockings, Sitka Area 1965.

<u>Lake</u>	<u>Location</u>	<u>Species</u>	<u>Number Stocked</u>
Surprise	Kruzof Island	Grayling	80,000
Beaver	Baranof Island	Grayling	20,000

Approximately 10,000 steelhead fingerlings were stocked in Indian River approximately 4-1/2 miles above tidewater in an attempt to bolster the existing remnant population.

The lakes in Table 3 were test netted during this report segment for population composition. Presented are the sampling results, and indications of angler usage. The streams investigated were checked by periodical observations, test angling, and interviews with resident anglers.

TABLE 3 - Waters Investigated During the 1965-66 Field Season.

<u>Name</u>	<u>Location</u>	<u>Game Species Present*</u>	<u>Angler Utilization</u>
Lakes:			
Baranof Lake	Baranof Island	CT	Mod.-Heavy
Beaver Lake	" "	None	---
Betty Lake	" "	None	None
Borodino Lake	" "	DV	None
Buck Lake	" "	CT	None
Gar Lake	" "	RB	Moderate
Grebe Lake	" "	RB	None
Gut Bay Lake	" "	DV	None
Sadie Lake	" "	CT	Light
Sashin Lake	" "	RB	Light
Suloia Lake	Chichagof Island	DV	None
Surprise Lake	Kruzof Island	None	---
Crystal Lake	Mitkof Island	BT	V. Light
Lower Spurt Lake	Petersburg Area	BT,RB	None
Goat Lake	Stikine Drainage	None	---

TABLE 3 (Cont) - Waters Investigated during the 1965-66 Field Season.

Name	Location	Game Species Present*	Angler Utilization
Streams:			
Sitkoh Creek	Chichagof Island	SH,RB,CT,RS,SS, PS,DS,DV	Mod.-Heavy
Suloia Creek	Chichagof Island	DV,PS,DS	None
Chaik Creek	Admiralty Island	CT,DV,PS,DS,SS	None
North Arm Hood Bay	" "	CT,DV,PS,DS,SS	None
Eliza Creek	" "	DV,PS,DS,SS	None
Port Banks Creek	Baranof Island	SH,RB,CT,DV,SS, PS,DS +	Mod.-Heavy
Sashin Creek	Baranof Island	SH,RB,CT,DV,PS, DS,SS	Light

*RB - Rainbow Trout
 CT - Cutthroat Trout
 SH - Steelhead Trout
 BT - Brook Trout
 DV - Dolly Varden
 RS - Red Salmon
 SS - Silver Salmon
 PS - Pink Salmon
 DS - Dog Salmon

Data depicted in Table 4 represents analysis of gill net sampling including lengths, and population comparison by species in percentage.

Sport Fish Egg Take Source

Dolly Varden Egg Take:

An experimental egg take of anadromous Dolly Varden was conducted to determine if significant numbers of eggs could be obtained for hatching and rearing purposes.

Prior attempts at artificial spawning of Dolly Varden by the Alaska Department of Fish and Game have been largely unsuccessful. Previous studies by Blackett and Armstrong (1964) has indicated that a higher percentage of mature Dolly Varden are present in non-lake stream systems than in lake systems.

The Katlian River and its South Fork, located 10 miles north of Sitka, was chosen for the egg take because of a substantial Dolly Varden population, ease of access, and the absence of a lake source.

The project began September 8 with the first seine hauls made in the South Fork. a 100-foot beach seine, 6 feet deep, and with a stretch mesh size of 2 inches, was used exclusively for capturing the Dolly Varden. Hook and line methods proved unsuccessful.

TABLE 4 - Test Netting Summaries, 1965.

<u>Lake Name</u>	<u>Number of Fish</u>	<u>Species*</u>	<u>Length Range (Inches)</u>	<u>Mean Length (Inches)</u>	<u>Freq.</u>	<u>Percent Comp.</u>
Beaver Lake	No Fish Taken					
Betty Lake	No Fish Taken					
Borodino Lake	65	DV	6.0 - 10.6	8.0	1.38	100
Buck Lake	66	CT	7.2 - 8.8	8.0	.35	97
Crystal Lake	27	BT	6.0 - 11.8	8.0	.56	100
Gar Lake	27	RB	6.6 - 12.3	7.6	1.28	100
Goat Lake	No Fish Taken					
Grebe Lake	31	RB	6.3 - 9.4	7.5	.44	100
Gut Bay Lake	9	DV	10.0 - 12.0	11.2	.09	100
Lower Spurt Lake	31	BT	4.5 - 20.4	7.0	.11	97
	1	RB	7.7	---	.003	3
Sashin Lake	22	RB	6.6 - 16.8	10.9	.24	100
Surprise Lake	No Fish Taken					

*DV - Dolly Varden

CT - Cutthroat Trout

BT - Brook Trout

RB - Rainbow Trout

Pool areas in both the main River and its South Fork were seined repeatedly depending upon fish availability and water conditions. Seining continued for an approximate three-week period ending September 30. During the actual seining the fish were sorted, then retained or discarded, depending upon their appearance as potential spawning fish. Water temperatures fluctuated from 42°F. to 44°F. throughout the egg take.

A total of 466 fish was captured, 345 from the main stem and 121 from the South Fork; 256 fish were discarded as it became apparent they would not mature. A total of 210 Dolly Varden, 60 males and 150 females, was retained for experimental egg-take purposes.

The fish were held in 4- x 4-foot pens constructed on 1/2-inch hardware cloth. The pens were lined with burlap to prevent physical injury to the fish and to reduce water velocity. The covering darkened the interiors and subsequently tended to reduce fish activity.

The ripening females were examined a day in advance of the planned spawning to determine the ones most suitable, and the ripest were separated for spawning. During the actual spawning the fish were subjected to MS 222 anesthesia, rinsed in fresh water and hand stripped. The dry method of spawning was used. Due to the varying degrees of ripeness exhibited by the females, spawning was conducted on 4 separate occasions, October 19, 22, 27, and concluded on November 4.

Sixty-eight females were spawned for approximately 225,000 eggs. Complete enumeration of ovaries from 51 mature females was performed. The mean number of eggs per female was 3,387 with a range from 5,968 to 1,230 (Roger Blackett, personal communication).

The mean number of eggs per pound of fish was 1,776 with a range from 2,908 to 1,005.

Otoliths were obtained from the sample of 51 fish for age analysis. Mature females ranged in age from V to X; 60 percent were age VIII to X (Robert Armstrong, personal communication).

The eggs were shipped via air in water-filled gallon jars, packed in insulated shipping boxes, and shipped to Alaska Department of Fish and Game hatcheries in Ketchikan and Anchorage. Ice was not used as the majority of eggs were shipped to Ketchikan and the enroute period was only two hours in length. Jar temperature at the beginning of each shipment was between 42°F. and 44°F.

Upon completion of the Dolly Varden egg-take, a number of observations were noted and recommendations are made for future operations of this type:

1. A notable variation exists in the degree of female maturity and ripeness at any given time. As a result it is necessary to plan and conduct several spawning operations as the females ripen.
2. Some physical injury was noted that was thought to have been a result of repeated handling. Most apparent was blood in the skeins. Due to the necessity of repeated examination, all handling must be done carefully to minimize this type of injury.

3. The lack of an adequate number of males was one limiting factor. The males appear to ripen and be capable of spawning at an earlier date than do the females. Many males were ripe in early September while the earliest ripe females were observed in mid-October. Subsequently, a number of these same males appeared spawned out by late October and were of little use.

Since influences of capturing, handling, and separation by sex is unknown it is suggested that the males be captured as closely as possible to the date of actual spawning. It is further recommended that the ratio of male to female fish held for spawning be 1:1.

4. A minor problem of fungus was noted, particularly on the heads of the fish. This appeared to have been caused by rubbing along the sides of the live boxes. As the holding period is quite long it is recommended that holding pens be well lined to prevent physical injury, and also darkened to minimize fish activity and movement.
5. The fish appeared quite hardy and little loss was experienced as a result of seining or holding in the live boxes.

The Dolly Varden egg-take was deemed a success from the standpoint of eggs successfully taken and delivered to the hatchery, the low occurrence of mortality, and information collected on spawning behavior.

Lower Southeast Alaska

Waters of the lower Southeast district were investigated along the guidelines established in the Techniques Used section. Additional data were collected on selected waters having previously been surveyed for specific purposes such as volume, fish population assessment, and related data.

Lake locations were listed by bearings to prominent land marks or geographic features for reference.

The U. S. Geological Survey Topographic Maps of Scale 1:63,360 were utilized in the survey work, and were of great assistance. The Federal Power Commission Report of 1947 on Water Powers, Southeast Alaska, was also of considerable help, and the water flows listed were of particular value.

The normal precipitation over the lower Southeast Alaska district varies from 100 to 200 inches per year. Little periodicity is noted with possibly October being wetter and stormier than the other months. Lowest drainage flows occur during the winter months at time of snow, and minimum temperatures occur between mid-December and late March. Saturation for dissolved oxygen is common over most of the year. Total alkalinity is low - about 16 ppm or lower of calcium hardness. Hydrogen-ion concentration is usually on the acid side of neutral and is commonly as low as 5.7. Lower readings may be found in bog lakes. Turbidity is of the glacial type which shuts out most of the light, causing relatively sterile conditions. Muskeg coloration (organic brown stain) is quite common in the bog type lakes.

Biological data was obtained to meet both immediate management needs and to continue inventory of other waters to determine success of previous stockings, population composition and condition, age determination, water temperatures and flows, lake surface and watershed acreages, ground surface covers, recreational potential, access, etc., to list part of the data. An adequate fish check was assumed to have been made when 6 net days (1 net day considered to be a standard 125-ft. experimental gill net set for 24 continuous hours) had been completed.

Scale samples were taken from all fish that were caught in the course of lake investigations. None have been read to date due to lack of opportunity. Previous readings indicated relatively slow growth rates attributable to prolonged low water temperatures and lack of dissolved nutriments.

The basic environment for the district as a whole was subject to no great changes.

Survey work was done on a number of lakes; a short review of the desired data collected is listed for each.

Lake Surveys

Angel Lake (unofficial name):

This lake lies in the Thorne River drainage on Prince of Wales Island 46 air miles from Ketchikan. It has 194 surface acres at elevation 60 ft. The lake is accessible to migratory fish; the resident segments of the populations of these species make up the sedentary residents with several cottoids. The lake has produced fine catches of cutthroat. A recreational shelter has been scheduled for this lake in the near future by the U. S. Forest Service. Access is presently by plane or by abandoned logging road from Thorne Bay.

Bakewell Lake:

A large lake (666 surface acres) that was reported in 1960. Since that date a steep-pass has been installed to bypass the barrier falls in the outlet by the Alaska Department of Fish and Game. The check this year was to contour survey the bottom (done) and seek the greatest depth (192 ft.) with a fathometer. Gill nets were set and six net-days produced adult sockeye, cutthroat, Dolly Varden cottoids and sticklebacks. The shelter and the skiff at the lake outlet were noted to be in excellent condition.

Donkey Lake (unofficial name):

A small lake in the system of Case Creek near Ketchikan between Whitman Lake and Blue Lake on the east slopes of Deer Mountain. The lake is 45 surface acres, almost half a mile long at elevation 966 ft., and is very deep. No fish were noted in this lake. There are no facilities on the lake nor a trail to it from the South Tongass Highway. The difficulty of access along the north side of Whitman Lake discourages most hikers. The easiest access presently is by boat the length of Whitman Lake and a hike up the main creek to Donkey Lake. This lake will produce trout and may be stocked at the earliest opportunity.

Emma Lake:

One of the lakes in the Naha River System tributary to Jordan Lake from the west. It is 122 surface acres at elevation 350 feet. A check was made of this lake to determine the presence or absence of fish and the suitability of the lake for potential recreational development. Test angling confirmed the presence of a climax population of cutthroat trout. Cottoids and sticklebacks were noted in the shallows and in the trout stomachs. There are no recreational facilities on the lake nor are any planned in the near future. Present access is by plane or a rough hike two miles through the virgin timber from the Naha Trail beginning at the inlet of Jordan Lake.

Galea Lake (unofficial name):

A lake in the Sweetwater Lake drainage of Prince of Wales Island some 60 miles from Ketchikan. This long, narrow lake is 360 surface acres at an elevation of 225 ft. It is accessible to migratory fish via the outlet. Silver and sockeye salmon are known to use the lake as well as cutthroat, rainbow, steelhead, Dolly Varden, cottoids, and sticklebacks. There is a new recreational shelter with a skiff about mid-point of the main lake.

Hofstad Lake (unofficial name):

A body of water at the head of Hofstad Creek, Vixen Inlet, on the southwest end of Ernest Sound. It has 166 surface acres at an elevation of 115 ft. There is a falls that blocks migratory fish in Hofstad Creek. The lake lies 35 miles northwest of Ketchikan by air. Test angling sufficed to establish the presence of a climax population of cutthroat trout, stickleback and cottoids. Dolly Varden are quite likely present also. There are no recreational facilities on the lake and access is normally by plane.

Klakas Lake:

This lake was first visited by the writer in 1951. Additional work since that survey (1965) has been the assessment of the lake outlet for a weir and spawn-taking station. The site measures 100 feet across. A check of the stream on Dec. 20, 1965, confirmed the presence of a rainbow population. Silver salmon were still spawning, and the portable shelter stacked on the beach of the stream mouth was still intact. No difficulties are expected with the physical aspect of designs on the lake outlet, and evidence of the required number of desirable fish warrants a trial spawn-taking setup.

Leask Cove Lakes (3 lakes with no official names):

The largest (186 acres) of the three lakes in the Leask Cove drainage was checked August 9, 1965 and sport gear supported the knowledge that there is a climax population of cutthroat in the lake as well as sticklebacks and cottoids. Sockeye salmon and silver salmon ascend the outlet to the lake when favorable flows exist in the outlet. Dolly Varden are presumed to be present also. The upper lake

probably does not have the migratory fish due to the small size of the outlet stream and its relatively steep grade. There are no recreational facilities on the lake nor a trail to the beach. Presently, the lake supports little fishing pressure. It is anticipated that the plan of logging access roads will change this in the foreseeable future.

Lucky Cove Lake #1 (unofficial name):

One of three lakes draining via a common outlet into Lucky Cove which is 17 miles southeast of Ketchikan. This lake is the highest of the three (375 ft.) and covers 186 acres. The fish population was checked with gill nets and found to have a climax population of cutthroat and Dolly Varden. Cottoids and sticklebacks are present also. There are falls in the outlet that deny access for migratory fish to the lakes. No trail exists from the beach to the lake nor is there any recreational development on it.

Lucky Cove #2 (unofficial name):

This is the smallest of the 3 lakes (71 acres) in the Lucky Cove drainage. The gill nets took cutthroat but no Dolly Varden. They are likely present with the forage fish (sticklebacks and cottoids). There are no recreational facilities on the lake, nor a trail to the beach.

Lucky Cove #3 (unofficial name):

The third lake of the Lucky Cove drainage is the lowest (70 ft.) and 96 surface acres. Nets were also set in this lake but took no fish. All three lakes are occasionally used by airborne deer hunters, but there is no record of fishing pressure on any of them. As they become better known, this may change.

McKinstry Lakes (2, no official names):

Located off Clover Pass and draining down Second Waterfall Creek is a cirque containing 2 lakes of 35 and 15 acres, respectively, at elevations 1,050 and 1,080 feet. These lakes were reported barren and a visual check disclosed no fish. A three-mile hike (no established trail) from the North Tongass Highway is the only present access. These two scenic lakes will figure stronger in the recreational needs very soon. There are no developments on the lake at present.

Notch Mountain Lake (unofficial name):

This fishhook-shaped lake is near the entrance of Thorne Arm on the southeast side and 17 miles from Ketchikan. It lies at an elevation of 1,050 ft. and drains into Potcover Cove. Falls in the outlet prevent the entry of migratory fish. It was first surveyed in 1960, subsequently planted with rainbow fry in 1961, and check netted in 1965. The nets confirmed a population has established itself, which was the object of the latest check. The lake is reached by plane and has been used as a hunting spot as well as fishing. There are no recreational facilities on the lake.

Old Franks Lake:

The largest in a system of 5 closely connected lakes on Prince of Wales Island and 37 miles west of Ketchikan. The lake is 492 surface acres with many islands at elevation 250 ft. There is a climax population of cutthroat and likely Dolly Varden also, with the usual forage fish - sticklebacks and cottoids. There are no recreational facilities on the lake nor a trail to the beach. It is presently reached only by air. It is a scenic lake and should soon be more popular with anglers than at the present time.

Orton Lake:

The Naha River system has many lakes and Orton Lake is one of the higher ones (935 ft.). There is no trail to the lake or recreational facilities on it. Access is by air 23 miles from Ketchikan. The lake was checked on Aug. 23, 1965 and experimental nets set which caught no fish. From all visual checks, the lake will produce fish and may well be stocked at the earliest opportunity. The numerous high falls in the outlet will enforce establishment of a resident stock of fish. With camping facilities this lake will be used by deer hunters also.

Salt Chuck Lake (unofficial name):

One of the lakes potentially part of the Ketchikan Area sport fishing picture, located north of the George Inlet Salt Chuck and tributary to it. It lies at an elevation of 184 feet and covers 122 surface acres. There is a climax population of cutthroat, stickleback and cottoids with Dolly Varden very likely present. Silver salmon use the system as do steelhead and probably sockeye salmon. No nets were set in the lake. It is 17 air miles from Ketchikan and may also be reached by skiff to the head of George Inlet and a stiff hike of 1-1/2 miles without trail through the woods from the head of the tide. There are no recreational facilities on the lake.

Lake Helen:

A relatively small lake (est. 60 acres) located on the stem of the Cleveland Peninsula at the head of Santa Anna Inlet. It is very close to tidewater and not much over 15 ft. above the highest tides. There are no barriers in the outlet to migratory fish. The fish population is the four species of salmon (no kings), and cutthroat, Dolly Varden, rainbow-steelhead, sticklebacks and cottoids. There are no recreational facilities on the lake, but a trapper's trail and skiff were noted. The lake is 55 miles from Ketchikan northwest. It was checked with the possibility in mind of a potential spawntaking setup being established. The magnitude of the runs are not known, however.

Shelter Cove Lakes (3, no official names):

These three lakes drain into Carroll Inlet at Shelter Cove 18 miles northeast of Ketchikan. Lake #1 (192 acres, elev. 380 ft.) drains through #2 (90 acres, est. 250 ft.) and #3 (160 acres at 380 ft.) drains to join the outlet of the first two near tidewater in Shelter

Cove. These lakes were checked with gill nets, and cutthroat were taken in #1 and #2 but only Dolly Varden were caught in #3. There are barrier falls to migratory fish in the outlet streams. No recreational facilities exist on these lakes and they are fished very little, although they are all less than two miles from tidewater. No great increase in fishing pressure is expected for the next several years on these lakes.

Smugglers Cove Lake (unofficial name):

A lake at the head of Smugglers Cove near the south end of the Cleveland Peninsula across N. Behm Canal and 23 miles from Ketchikan. It is the lowest of a series of 3 lakes, and there is a 60 ft. falls at the head of tide water with 2 more barriers between this one and the first lake. The lake itself is relatively shallow and has large areas of pond lily. Gill nets took only Dolly Varden with sticklebacks and cottoids in the stomachs. There is a private cabin near the outlet on the east side of the lake and no established trail to the beach one mile away. The lake gets very little fishing pressure, but receives some use as a base for deer hunting by plane hunters. The surface area measures 244 acres at elevation 130 feet. The lack of depth and the Dolly Varden population suggests oxygen depletion at times, which points up the need for further work before more management is practicable.

Snow Lake:

One of the northernmost lakes in the Naha River Drainage lying at an elevation of 1,054 feet and 21 miles north of Ketchikan. The surface area is 109 acres and the easiest access is by plane. Nets set in the lake took no fish. Some use of the lake has been made by airborne deer hunters. It is very scenic and will support fish when introduced. There are serious barriers between this lake and Chamberlain Lake below in the form of high falls. Presently, there are no recreational facilities on the lake.

Sweetwater Lake:

A large lake draining into Lake Bay and Whale Passage on the north end of Prince of Wales Island, 60 airline miles northwest of Ketchikan. It has a surface estimated at 1,800 acres. It's low elevation allows extreme high tides to enter the lake through Gold and Galligan Lagoon. There is a "chuck" which develops, depending on the stage of the tide, which requires caution when entering by boat. There are four species of salmon (no kings) using the lake, as well as cutthroat, Dolly Varden, rainbow-steelhead, cottoids and stickleback. There is comparatively little pressure on the system due to its distance from any community. However, great potential exists here for sport fishing as well as deer and waterfowl hunting. There is a recreational shelter with a skiff, installed in 1965 by the U. S. Forest Service on the southwest end of the lake. Present access is by plane or by boat to the Indian Creek arm of Whale Passage and then usually by skiff, through the Chuck to Barnes Lake, through Gold and Galligan Lagoon, and the rapids into Sweetwater Lake.

Steelhead Egg-Take

Wolf Lake (name seen on old U.S.G.S. Map 1:250,000):

This lake lies between Hollis and Karta River on Prince of Wales Island, 41 airline miles northwest of Ketchikan. It has 109 surface acres at an elevation of 1,110 feet. There are many falls in the outlet impassable to fish. This lake was first checked in 1962, found barren, and planted with rainbow the next year. This check verified an established population from that planting. To date, there are no recreational facilities on the lake nor any established trail from the beach. As it becomes known, this lake should be popular with Ketchikan anglers.

Angler harvest of resident and anadromous sport fish is largely a summertime activity in this district. It is coincident that most of the fish are more readily available during the late spring, summer and early fall when the most anglers avail themselves of them. However, for the hardy and enthusiastic, there are the same species available during the winter, but with few takers. Occasionally, the weather gets cold enough to create safe ice covers on the lakes, but there are few enthusiasts for this sport (ice fishing) and steelhead fishing is scarcely possible with the line freezing to the rod. A few boats are noted fishing king salmon in Tongass Narrows all winter; the high demand for the fish is the main motivation to fish them.

The investigation of new lakes and aquisition of data on previously checked waters usually included a fish population assessment.

On new waters, test angling often verified the presence of an existing population and the subsequent need for gill netting for species composition. Whenever a definite composition cross section was desired, gill nets were utilized. On the other hand, if determination of fish existence was the only objective, test angling was commonly used.

Information in Table 5 depicts results from lakes tested by both these techniques during 1965.

Fish Stocking

Experimental stockings on several waters were undertaken. Buckhorn Lake and Dwndraft Lake were each planted with 3,000 steelhead fry on July 19. These lakes had been checked previously and found barren of fish. Both are relatively near Ketchikan (12 miles) but access is normally by plane.

An experimental air drop of 825 rainbow fry was made on July 22 in a small cirque lake (unofficially named McKinstry Lake) near Clover Pass. This lake also had been devoid of fish and is a 2-1/2-mile hike from the North Tongass Highway.

Grayling fry were received from the Fire Lake Hatchery on June 11. The weather was not good, but 33,000 fry were planted in Big Goat Lake, 33,000 in Upper Sun Dial Lake and 33,000 in Manzoni Lake. Big Goat Lake had been previously planted with eyed eggs without notable success.

TABLE 5 - Results of Population Sampling, Ketchikan Area Lakes, 1965.

Lake	Date		Species	Catch*	Species	Size
	Stocked	Checked				
Angel				Fish seen None taken	Cutthroat Sockeye	12" 28"
Bakewell	1955 1954-58		Coho Sockeye	5(6nd) 58 " 3 " 5 "	Sockeye Cutthroat Dolly Varden Cottoids	26"-29" 6"-13" 8" 5"- 8"
Emma				6(2aH)	Cutthroat	5"- 9"
Hofstad				12(4aH)	Cutthroat	7"- 9"
Klakas				2(6aH)	Rainbow	14"
Leask Cove				4(4aH)	Cutthroat	5"-14"
Lucky Cove #1				31(6nd) 72 "	Cutthroat Dolly Varden	9"-13" 6"-12"
Lucky Cove #2				11 "	Cutthroat	7"-11"
Lucky Cove #3				0 "		
Notch Mtn.	1961		Rainbow	2(2nd)	Rainbow	11"
Old Frank's	1953		Sockeye	9(10aH)	Cutthroat	8"-13"
Orton				0(6nd)		
Saltchuck				6(3aH)	Cutthroat	7"- 9"
Helen				1(3aH)	Cutthroat	8"
Shelter Cove #1				9(4nd)	Cutthroat	6"-10"
Shelter Cove #3				13 "	Dolly Varden	5"-11"
Smuggler's Cove	1955		Silver Salmon	46(6nd)	Dolly Varden	7"-15"
Snow				0(6nd)		
Wolf	1963		Rainbow	10(3aH)	Rainbow	5"- 6"

*nd = net days; aH = angler hours

Steelhead Egg-Take

An egg take was attempted on steelhead at Alecks Creek on Kuiu Island. The cabin was assembled and the weir built, which subsequently proved inadequate for the high water and some of the fish went over the top. The net production of the Tebenkof operation was 41,488 eyed steelhead eggs. In total, 31,720 were shipped to the Auke Lake Hatchery and 9,768 were held for planting in the Ketchikan area. The operation was shut down on May 22. The portable cabin was moved to Klakas Creek on Prince of Wales Island on September 10, and stored on the beach.

A check was made on the possibility of using the stream at the head of Santa Anna Inlet on May 5. The system is unknown as to magnitude of fish runs. The weir site is workable in the lake outlet. No fish were noted on the day the check was made. Further sampling should be attempted at a later date.

On May 5, a check was made on the outlet of Klakas Lake on Prince of Wales Island. Both rainbow and steelhead were noted here, and there is an excellent weir site at the lake outlet. The fish run in this system is known to contain a number of steelhead. There are several other locations with considerable potential if the Klakas site is not satisfactory.

Close contact has been maintained with Access Biologist Ed Cramer regarding public access to the many waters that are totally undeveloped at the present time. As surveys disclose potential sport fishing locations in areas of possible use controversy, the data is submitted for proper action.

Land use practices affecting water quality and fish habitats are kept under constant watch. Siltation from logging roads is a recognized hazard that presently seems to be held to a minimum. Removal of streambank forest cover poses the threat of higher water temperatures and gravel movements, botanical changes and debris loads.

LITERATURE CITED

Blackett, Roger F. and Robert H. Armstrong

1964 "Investigation of Anadromous Dolly Varden Populations in the Lake Eva-Hanus Bay Drainages, Southeastern Alaska." Volume 6, Job No. 2-B, Dingell-Johnson Reports, 1964-65; State of Alaska.

Prepared by:

Rupert E. Andrews
Fishery Biologist, Upper Southeast

Larry Heckart
Fishery Biologist, Upper Southeast

Robert Baade
Fishery Biologist, Lower Southeast

Date: March 31, 1966

Approved by:

s/Louis S. Bandirola
D-J Coordinator

s/Alex H. McRea, Director
Sport Fish Division

Date: March 21, 1966

Lizarski Biological Station, Alaska

Project: Arctic Grayling



Arctic Grayling are Being Introduced into Several Lakes in Southeastern Alaska.

Arctic Grayling Lake

An egg lake was introduced on steelhead at Alaska Creek on June